Achene 2 to 3 times as long as wide, 2 mm. long, 0.7 to 1 mm. wide; glumes 2.2 to 3 mm. long, 1.8 to 2 mm. wide, obsoletely nerved, lustrous, the margins tightly involute and frequently meeting or even overlapping at the rhachilla.....*C. Nashii.*

Below are some typical examples of *C. Nashii:*

TYPE SPECIMENS: *Nash* 1196, Eustis, Lake Co., FLORIDA, August 16–25, 1884, in the New York Botanical Garden. Photograph in the Langlois Herbarium. FLORIDA: *Britton* and *Wilson* 28; *Correll* 5846; *Correll* and *McFarlin* 6228; *Chapman*, Apalachicola in 1889; *Cuthbert*, Bradentown; 1613; *Hitchcock*, Eustis; *Nash* 1195, 1196 (type); *O'Neill* 5094, 5095, 7241, 7242, 7244; *Pieters* 45; *Small* and *DeWinkler* 9986; *Small*, *Small* and *Dewinkler* 10640; *Small* and *West*, Avon Park; *West*, Lake Worth, Palm Beach County; *West* and *Arnold*, Gilchrist County; *Tracy* 6316. GEORGIA: *Eyles* 6496.

(*To be continned*)

NOTES ON SOME FRESH-WATER ALGAE FROM NEW ENGLAND[1]

A. H. GUSTAFSON

STUDIES on the New England fresh-water algae have extended over a considerable period of time, have been carried on by a large number of well-known algologists both native and foreign, and have been published in an extensive series of papers but our knowledge of even such problems as their occurrence and distribution is fragmentary. The first record of a specific alga together with its place of collection appears to be that of Eaton (6) in 1817. An appendix to Bailey contributed by Cole (3) lists certain species from Salem, Massachusetts and Olney (11) published early Rhode Island records. Since the middle of the last century more than 150 papers containing data on the New England fresh-water species have appeared. A list of the authors of these papers includes a large proportion of the better-known American students as well as a number of representative European scholars. Data on the Maine species has been supplied for the most part by Harvey (7, 8, 9) and West (15, 16) and is far from complete. New Hampshire has been a fertile collecting ground especially for students of the desmids and a considerable

[1] It is a pleasure to acknowledge financial assistance from the Williams College 1900 Fund in carrying on this study.

number of new species have been described from the state but the other algal groups are poorly known. The Vermont records are very scanty. The Reports of the Massachusetts Water Board especially in the decade from 1880–1890 were outstanding in many respects but their contribution to distributional and taxonomic problems left much to be desired. The presence of the Marine Biological Laboratory at Woods Hole, Massachusetts has done much to stimulate a study of the waters of that region. Miss Croasdale's (5) summary of the species known from the Woods Hole area is a valuable contribution to our knowledge of the Massachusetts algal flora but it deals with a limited area and in common with all the studies referred to above made no attempt to treat all the groups now generally regarded as algae. Bennett's (2) Rhode Island list while extensive is certainly not complete. The state-wide survey of Connecticut by Hylander (10) probably makes our knowledge of the Connecticut fresh-water algal flora more complete than that of any of the other New England states but as in the other studies not all algal groups were considered.

Collections made in various parts of New England have revealed the presence of a number of species which will assist in filling in some of the recognizable gaps in our knowledge. These are listed together with some notes on their distribution and occurrence. Several of the species have no doubt been found by previous investigators but no published records exist. Thirty-five species are recorded several of which are rare in the United States. Twenty-five appear to be new finds for New England. Four are first records from Maine; three have been added to the New Hampshire flora; 17 have not previously been recorded from Vermont; and the list known from Massachusetts has been increased by 27.

With the exception of the insertion of the *Cryptophyceae* the systematic treatment follows Smith (12).

MYXOPHYCEAE

GOMPHOSPHAERIA LACUSTRIS Chodat. No previous report from New England. Found at Laurel Lake, Lee, Massachusetts; Kennebec River, Maine; Lake Ossippee and Lake Mascoma, New Hampshire; White River, Vermont and several Vermont lakes.

HETEROKONTAE

CENTRITRACTUS BELENOPHORUS Lemmerman. There appears to be no published report of its occurrence in the United States although Dr. James Lackey of the United States Public Health Service Laboratory in Cincinnati, Ohio has shown the author many specimens from the tributaries of the Ohio and it has also been found by the author in Michigan (in press). Found in Cole Pond, Williamstown, Massachusetts.

CHRYSOPHYCEAE

CHRYSOSPHAERELLA LONGISPINA Lauterborn. Known only three or four times from widely scattered regions in the United States but not from New England. Found in Sucker Pond, Stamford, Vermont.

DINOBRYON BAVARICUM Imhof. The only New England record is from Connecticut (1). Abundant in the plankton of Lake Raponda, Wilmington, Vermont and sparingly in Lake Sadawga, Whittingham, Vermont, as well as in a bog-pond in Jacksonville, Vermont.

DINOBRYON DIVERGENS Imhof. Not known from New England. Abundant in the plankton of Laurel Lake, Lee, Massachusetts and Lake Garfield, Monterey, Massachusetts.

DINOBRYON SERTULARIA Ehrenberg. This is without question one of the commonest of the New England algae. Found as a very abundant plankton organism all through Maine, New Hampshire, Vermont and western Massachusetts. The only previous records are from Connecticut (4) and Massachusetts (3).

CHLOROPHYCEAE

VOLVOCALES

CHLAMYDOBOTRYS GRACILE Korshik. There appears to be no certain published record of this species in the United States although Dr. James Lackey has shown the author many specimens from the tributaries of the Ohio River. Found in the summer of 1940 in the Androscoggin River at Lewiston, Maine in small numbers under interesting conditions. The odor of H_2S emanated from the Androscoggin to such an extent that it could be detected for some distance from the river and, naturally, caused considerable comment and concern in the vicinity. Samples from the surface waters at Lewiston revealed several species of blue-green algae which were not determined specifically. The lone species of green alga sparingly present although apparently in very good condition was the one under discussion. It showed very clearly in a number of slides made from the material. Interestingly enough chemical analyses of the water

made a few days before the samples were studied microscopically showed oxygen to be present only to the extent of half a part per million.

PHACOTUS LENTICULARIS (Ehrenberg) Stein. Found only three or four times in the United States but never from New England. Collected at Bridge's Pond and Cole Pond, Williamstown, Massachusetts as an occasional plankton type.

PLEODORINA CALIFORNICA Shaw. Not known from New England. Found in Cole Pond, Williamstown, Massachusetts and in Woodford Pond, Woodford, Vermont.

ULOTRICHALES

RADIOFILUM CONJUNCTIVUM Schmidle. Smith (12) states this species occurs infrequently in the United States and it has not been listed from New England. Collected several times in Bridge's Pond, Williamstown, Massachusetts and in Lake Raponda, Wilmington, Vermont as well as in roadside ditches in Pownal, Vermont.

CHLOROCOCCALES

GOLENKINIA PAUCISPINA W. and G. S. West. Not known from New England. Collected in the Connecticut River at Turner's Falls, Massachusetts; in Cole Pond, Williamstown, Massachusetts; and in the Connecticut River at Brattleboro, Vermont.

GOLENKINIA RADIATA Chodat. This common planktonic form has not been recorded from New England. Found in several lakes in western Massachusetts as well as in the Housatonic River at Great Barrington, Massachusetts; also, in the White River at White River Junction, Vermont and in Woodford Pond, Woodford, Vermont.

QUADRIGULA CHODATA (Tanner-Fullman) G. M. Smith. New to New England; Leake Pond, Williamstown, Massachusetts.

SCENEDESMUS ACUMINATUS (Lagerheim) Chodat. Known from Connecticut (10); Cole and Warren Ponds, Williamstown, Massachusetts.

TETRAEDRON HASTATUM (Rabenhorst) Hansgirg. New to New England; Cole Pond, Williamstown, Massachusetts.

TREUBARIA TRIAPPENDICULATA Bernard. New to New England; Warren Pond, Williamstown, Massachusetts and the Housatonic River, Great Barrington, Massachusetts.

ZYGNEMATALES

COSMARIUM DENTICULATUM Borge. New to New England; Gokey Pond, Kingston, Massachusetts.

COSMOCLADIUM SAXONICUM DeBary. This species not known from New England is rare in the United States. Found in Lake Onota, Pittsfield, Massachusetts and in a bog-pond in Jacksonville, Vermont.

EUASTRUM GLAZIOVI Borgesen. Not known from New England; found in Lake Raponda, Wilmington, Vermont.

STAURASTRUM ARCTISCON (Ehrenberg) Lundell var. GLABRUM W. and G. S. West. Not known from New England; collected at Lake Onota, Pittsfield, Massachusetts, and in Lake Bomoseen, Vermont.

STAURASTRUM LACUSTRE G. M. Smith. Not known from New England; Lake Raponda, Wilmington, Vermont and Woodford Pond, Woodford, Vermont.

STAURASTRUM SETIGERUM Cleve. Known from Connecticut (10); Lake Pontoosuc, Pittsfield, Massachusetts.

TRIPLOCERAS GRACILE Bailey, var. BIDENTATUM Nordstedt. New to New England; Informe Pond, Hyannis, Massachusetts.

CRYPTOPHYCEAE

CRYPTOMONAS EROSA Ehrenberg. The genus has been listed for New England but the species has not been designated. Found at several ponds in Williamstown, Massachusetts.

CRYPTOMONAS OVATA Ehrenberg. Unger (14) lists for Maine. Found all through western Massachusetts, in several lakes in southern Vermont and central New Hampshire as well as in the Kennebec River, Maine.

DINOPHYCEAE

CERATIUM HIRUNDELLA (O. F. Müller) Schrank. The genus has been reported frequently from New England but never with the specific designation although as a species frequently dominant in the plankton it must have been collected by almost every student of the algae. Frequent or abundant everywhere in collections from Maine, New Hampshire, Vermont, and Massachusetts.

EUGLENOPHYCEAE

EUGLENA OXYURIS Schmarda. Not reported from New England; Cole and Warren Ponds, Williamstown, Massachusetts.

EUGLENA SPIROGYRA Ehrenberg. Known from Maine (14), Connecticut (4), and Massachusetts (3); occasional specimen from roadside ditches in Woods Hole and Williamstown, Massachusetts and Pownal, Vermont.

PHACUS ACUMINATUS Stokes. Apparently not reported from New England although it is a common species; found at several stations in Massachusetts such as Woods Hole, Worcester, Shelburne Falls, and Williamstown.

PHACUS LONGICAUDA (Ehrenberg) Dujardin. No New England report since that of Cole (3). Found at Woods Hole and Williamstown, Massachusetts as well as from Pownal, Vermont.

LEPOCINCLIS OVUM (Ehrenberg) Lemmerman. The only previous New England record is from Maine (14). Found in the

plankton at Warren Pond, Williamstown, Massachusetts and the Housatonic River, Great Barrington, Massachusetts.

TRACHELOMONAS CREBEA Kellicott. First New England record seems to be from Cole Pond, Williamstown, Massachusetts.

TRACHELOMONAS HORRIDA Palmer. Listed by Unger (14) from Maine; found in Cole Pond, Williamstown, Massachusetts.

TRACHELOMONAS URCEOLATA Stokes. Unger (14) lists the variety SERRATOGLABRA from Maine but the species appears to be new to New England. Found in Warren Pond, Williamstown, Massachusetts.

TRACHELOMONAS VOLVOCINA Ehrenberg. Listed from Connecticut (4) and Maine (14); found in Lake Raponda, Wilmington, Vermont and in roadside ditches Pownal, Vermont, as well as abundantly throughout western Massachusetts.

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